

عنوان مقاله:

Evaluation of a Seismic Collapse Assessment Methodology Based on the Collapsed Steel Buildings Data in Sarpol-e Zahab, Iran Earthquake

محل انتشار:

فصلنامه زلزله شناسی و مهندسی زلزله، دوره 20، شماره 3 (سال: 1397)

تعداد صفحات اصل مقاله: 13

نویسندگان:

(Mohammad Mahdi Maddah - *International Institute of Earthquake Engineering and Seismology (IIEES)*)

(Sassan Eshghi - *International Institute of Earthquake Engineering and Seismology (IIEES)*)

خلاصه مقاله:

The collapse evaluation of the seismically vulnerable structures is very important in any earthquake risk reduction program. There are several analytical methods currently available to assess the collapse capacity of structures under earthquake ground motions. Severe earthquakes in cities provides a unique opportunity to evaluate the effectiveness of the seismic collapse assessment methods. On November ۲۱, ۲۰۱۷, an earthquake with the moment magnitude of ۷.۳ and the PGA of ۰.۶۹ g occurred in about ۳۷ kilometers northwest of Sarpol-e Zahab region (Kermanshah, Iran). This earthquake caused the collapse of significant numbers of low and mid-rise steel structures. In this paper, an attempt is made to examine the efficiency of an approximate incremental dynamic analysis (IDA) method to estimate the collapse capacity of conventional steel structures. To this purpose, two partially collapsed steel structures are selected. Both two structures are comprised of an ordinary moment resisting frame system in one direction, and a braced frame system in other perpendicular direction. The dimensions and permanent displacements of these structures have been measured on-site. These buildings are modeled in a finite element program and analyzed by modal pushover analysis in two major directions, and the SDOF models are extracted. In the next step, the SDOF models are analyzed by the IDA method under the selected earthquake records. The median and dispersion of collapse capacity of the structures are calculated from the approximate IDA results. Finally, the collapse probability of these structures is calculated under the maximum considered earthquake (MCE), determining the uncertainties based on FEMA P۶۹۵ relation and engineering judgments. The results show the development of simplified and inexpensive methods for collapse assessment is crucial to be implemented to identify existing killer buildings in cities prone to major earthquakes.

کلمات کلیدی:

Sarpol-e-Zahab (Kermanshah) Earthquake, Collapse Assessment, Steel Buildings, Pushover Analysis, Collapse Capacity, Collapse Probability

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1298408>



